

CLAIMS

We claim as our invention:

1. A method for producing nanostructures, comprising the steps of:
 - a. providing at least one type of sinterable precursor nanoparticulate material,
 - b. attriting a predetermined volume of said precursor nanoparticulate material or materials under a protective non-reactive fluid blanket having substantially higher density than that of water, with the dual purpose of breaking up any aggregates and mechanically removing any adsorbed volatiles, moisture, atmospheric gases or contaminants from the surface of said nanoparticulates or from the fresh surfaces generated during attrition,
 - c. separating any contaminants thus removed from the deaggregated nanoparticulates,
 - d. removing the protective fluid blanket from the decontaminated nanoparticulates using vacuum distillation,
 - e. desorbing the surface of the nanoparticulates by applying a sufficiently high vacuum,
 - f. allowing a predetermined volume of a suitable surfactant to adsorb onto the surface of the said desorbed nanoparticulates such that at least 50% of the nanoparticulates' surface will be coated with a monolayer of said surfactant.

- g. dispersing said surfactant-coated nanoparticulates in a predetermined volume of a suitable degradable thermoplastic binder to form a homogeneous thermoplastic compound
 - h. shaping said thermoplastic compound into green bodies,
 - i. extracting substantially all of the organic thermoplastic material from said green bodies and sintering the thus obtained organic-free preforms.
- 2. The method of Claim 1 whereby the said nanoparticulate materials are selected from the class of metals and their alloys, ceramics and their alloys and mixtures of metals and ceramics or their alloys, including metal oxides, carbides, borides, nitrides, silicides, aluminas, mullite, zeolites and combinations thereof.
- 3. The method of Claim 1 whereby the said degradable thermoplastic binder ingredients are selected from the class of polyolefins, waxes, plasticizers, greases, oils, surfactants and mixtures of these.
- 4. The method of Claim 1 whereby the formation of aggregates is reduced or prevented.
- 5. The method of Claim 1 whereby the pyrophoricity of nanoparticulates is controlled.
- 6. An integrated method for the fabrication of nanostructures.
- 7. The products of Claim 1.